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ARCHAEOLOGY OF MAMMOTH CAVE AND VICINITY: A PRELIMINARY REPORT

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American anthropology appears to have arrived at something like a turning point in its history. The continent has now been covered more or less intensively and on the basis of the collected data both the ethnologists and the archaeologists are beginning to publish maps outlining in a tentative way the boundaries respectively of the historic and the prehistoric culture centers. (See W. H. Holmes, also Clark Wissler, *Amer. Anthrop., New York,* **16**, No. 3, 1914; and Wissler in the Holmes Anniversary Volume, 1916.) These two maps, as would be expected, while not identical show a noteworthy correspondence.

The question at once arises: how came these centers of cultural intensification to be? Thus far we have no scientific answer. We may say either that they were originated and developed in place or that they were transmitted from without, or finally—and what is most likely—that they are the products partly of transmission and partly of local origination. In any event the given culture complex did not drop out of the heavens in its perfected form: it has a history and what that history has been is for the archaeologist to determine.

That the archaeologist can do this service need not be questioned. He has done it—or at least so it appears—in Europe. To some of us his performance is not entirely satisfactory as yet and when he insists that by searching in the New World we shall find the identical state of things which he himself has found in the Old World we openly rebel.

But having said this we must still allow the European to point with pride to his chronological series and at the same time admit the justice of his criticism to the effect, viz., that our own investigations are almost totally deficient in this respect. Our museums abound in choice collections from this and that type locality but we possess little knowledge of how the diversified cultural traits of which these collections bear testimony came about or what are their antecedent relationships. In so far as we mentally arrange these cultures in order of their complexity beginning, let us say, with the shellmound peoples and ending with the Mayas or the Incas it is a purely selective procedure, perhaps essentially true but nevertheless devoid of real scientific merit.

It is true that some sporadic efforts at chronological determinations of different sorts have been made, as, for example, by Dr. Uhle in Peru, by Dr. Spinden in the Maya area, by the writer and others in the California shellmounds and by a number of men from different institutions—including the American Museum—in the Trenton gravels, as well as in several of the rockshelters of New Jersey and finally by the writer again in the Southwest. All these attempts are of very limited significance, however, each embracing but an infinitely small segment of the entire cultural curve. Without elaborating on the subject any further it must be tolerably clear from the foregoing how urgent is the need for problem work in American archaeology.

Being convinced of this necessity, the American Museum last summer made a preliminary investigation of some of the Kentucky caverns. Caves and rockshelters, in view of the wonderful returns they have yielded in Europe, are difficult to resist even though they have been tried over and over again in America with practically negative results. The general locality was deliberately chosen as being well south of the limits of glaciation, and in fact in some respects quite comparable to the Lower Pyrenees. The quest was not precisely to find evidence of Paleolithic man; it was merely to ascertain whether in the middle Mississippi region there was any trace of a relatively primitive stage of development that might have given rise to the Moundbuilder culture as we know it at its best. In this the writer, who conducted the investigation, is at least morally certain that he succeeded.

In the spring of the year, after consulting with Professor Arthur M. Miller of the Geological Department of the State University at Lexington, two series of caves and shelters were inspected: one along the Kentucky River, south of Lexington, and the other along the Green River in the vicinity of Mammoth Cave. Later in the season some trial excavations were carried out in several of the Green River sites and positive results were obtained in two places, viz., in Mammoth Cave and in a small unnamed rockshelter about six miles lower down the river.

The discovery in Mammoth Cave consisted of a stratified relic-bearing deposit ranging from a few inches to about 4 feet in depth and forming part of the floor debris of the large entrance vestibule. In some places the refuse reached the surface of the cave floor while in others it was buried under as much as 4 feet of sterile cave earth and rock laid down unquestionably by modern man. The body of the refuse was composed largely of ashes, being presumably the slow accumulation of aboriginal hearth fires. In this matrix was found a considerable quantity of crushed animal bones among which have been distinguished the deer, beaver, opossum (?), turtle, bat and several birds; as well as numerous shells representing two or three species of fresh-water bivalves,—all of it together being nothing more nor less than 'kitchen' refuse. Isolated portions of the human frame, such as, for example, the distal end of an adult femur, a small fragment of a pelvic girdle and several teeth, were met with at different levels in the deposit; but the remains are not, as might be supposed, in such a state as to suggest cannibalism. Of artifacts in a stricter sense of the term there were obtained a small series of awls and other pointed implements made from bone and antler, many of them being simply improvised from splinters while a few were as perfect as anything of the sort found in America. The flint specimens consisted of numerous reject flakes (some of them apparently used) and five or six chipped blades, mostly fragmentary. Of workmanship in shell there came to light two perforated pendants and several half-shells that may have served as spoons or scrapers. Finally, there were uncovered three more or less crude pestle-like objects made of limestone. And that was all. Several test trenches were opened at different places and quite a number of cubic yards of the refuse was most carefully worked over, but without avail. Not a trace could be found either of maize or of pottery or of any of the finer forms of polished stone work otherwise so characteristic of the general region. The absence of these things in Mammoth Cave may be an accident but if so it is most extraordinary.

The second discovery, as previously stated, was made in a rock-shelter about six miles down the Green River, in the bluff opposite the lower end of Boardcut Island. The place is about three miles in an airline from the Mammoth Cave. Here in the natural floor earth was found a thin stratum of ashes containing bits of flint and also fragments of pottery. A little deeper down was laid bare a stone-grave burial of the type so often met with in that section of the Mississippi basin and generally accepted as of relatively late date. Unfortunately nothing whatever accompanied the interment, and as conditions did not permit digging more than the one test pit no complete artifacts were obtained from the shelter.

The significance of these two isolated horizons of culture, briefly stated, seems to be that we have evidence in the one instance of an agricultural people and in the other of a people who lived mostly if not entirely by hunting. The rockshelter horizon being clearly associable with the later developments in the Moundbuilder area, we must assume the cultural segment in the Mammoth Cave to antedate it. At the same time it should be emphasized, in conclusion, that the Mammoth Cave horizon, in view of the faunistic remains accompanying it, cannot in any absolute sense be regarded as ancient.

A detailed discussion of these investigations will appear in the Anthropological series of the American Museum of Natural History, New York City.

THE PRODUCTION IN DOGS OF A PATHOLOGICAL CONDITION WHICH CLOSELY RESEMBLES HUMAN PELLAGRA

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The nutritional diseases designated as beri beri, scurvy and pellagra are currently believed to be induced by a deficiency in the diet of some undefined but essential constituent or constituents. From the experimental standpoint the pigeon is peculiarly sensitive when the diet fails to provide a sufficiency of these unknown but essential food substances, and polyneuritis develops. The symptoms of polyneuritis in birds closely resemble those of beri beri in man. The guinea pig has proved to be especially susceptible to scurvy. On the other hand, pellagra in the ordinary laboratory animals is rarely mentioned.

We have accomplished the experimental production in dogs of a diseased condition which closely resembles human pellagra. The characteristic phenomena are readily evoked by feeding these animals a diet consisting of boiled (dried) peas, cracker meal and cotton seed oil, or lard. The ingestion of suitable quantities of meat causes the symptoms of disturbed nutrition to disappear. On the other hand, if the amount of meat contained in a selected mixed diet is insufficient, the same evidences of abnormality may be exhibited. The symptoms appear in varying periods of time which may be altered by changes in the character of the diet.

The onset of the symptoms is generally very sudden. Usually the first abnormal manifestation in dogs is a refusal to eat, and cursory examination reveals nothing to account for the loss of appetite. The animal lies quietly in its pen and is apathetic. After continued refusal to eat for a day or two, the mouth of the dog presents a peculiar and characteristic appearance, in that the inner surface of the cheeks and lips, and the edges of the tongue, are so covered with pustules as to give the impression of a mass of rotten flesh. The odor from the tissues is foul. The mucous lining of the mouth comes away in shreds when stroked with absorbent cotton. Intense salivation exists. The teeth remain normal. A bloody diarrhoea is present, attempts at defecation being very frequent, and resulting in the passage of little more than a